NOTES ON CHROMOSOME CYTOLOGY OF RUTACEAE—DIOSMEAE

The tribe Diosmeae R. Br. emend. Benth. & Hook. f. (1862) of the Rutaceae is strictly African in distribution and consists of the widespread tree *Calodendrum capense* (L.f.) Thunb. (southern Cape to north Kenya) and some 280 species of small to medium-sized shrubs, mostly of ericoid habit. The tribe is, with the exception of *Calodendrum,* restricted to southern Africa and largely to the Cape Region of the south and west coast of South Africa. Taxonomic revisions of the tribe have recently been published for all but the large genus *Agathosma* (Strid, 1972; Williams, 1975, 1978, 1981a, 1981b, 1982) but chromosome cytology of the group is poorly known.

Apart from several counts by Strid (1972) for *Adenandra,* there are only scattered reports for a few genera. The monotypic *Calodendrum* is a high paleopolyploid with $2n = 54$ (Honsell, 1954; Smith-White, 1954). In *Agathosma, A. crenulata* (L.) Pill. has been reported as having $2n = 45$ (as *Barosma*) (Riley & Hoff, 1961), while Guerra (1984a) found $2n = 26$ in *A. apiculata* E. Meyer (also as *Barosma*) and *A. lanceolata* (L.) Engl.

There are two counts for *Coleonema pulchellum* I. J. Williams (as *C. pulchrum* Hook.), Smith-White (1954) reporting $2n = 36$ and Guerra (1984a) $2n = 34$; Guerra also reported $2n = 34$ in the closely related *C. album* (Thunb.) Bartling & Wendl. Numbers reported in *Adenandra* are $2n = 28$ in two species, 38 in one more, 42 or ca. 42 in two species including *A. fragrans,* and $2n = 48$–50 in another three. In conjunction with continuing systematic studies of Diosmeae a preliminary investigation of the chromosomes of some genera was undertaken and this report is the result of the study.

All counts were made from mitotic metaphase in root tip squashes of germinating seeds, following a method described fully elsewhere (Goldblatt, 1979, 1980). Chromosome number and voucher information are as follows:

Diosma subulata Wendl. $2n = 30$. South Africa, Cape, ex hort. Williams, *Williams s.n.* (NBG); Wortelgat, Caledon Div., *Williams 1721* (NBG).

Diosma aristata I. J. Williams $2n = 30$. South Africa, Cape, ex hort. Williams, *Williams s.n.* (NBG).

Diosma oppositifolia L. $2n = 30$. South Africa, Cape, Vogelgat, Caledon Div., *Williams 2406* (NBG).

Euchaetes avisylvana I. J. Williams $2n = 28$. South Africa, Cape, Grootvadersbos, Heidelberg Div., *Williams 2377* (NBG).

Adenandra fragrans (Sims) Roemer & Schultes $2n = 42$. South Africa, Cape, Grootvadersbos, Heidelberg Div., *Williams 2378* (NBG).

Discussion

The count of $2n = 42$ for *Adenandra fragrans* confirms the earlier report by Strid (1972) for this species. Reports here for *Euchaetes* and *Diosma* are the first records for these genera. On the basis of four counts for three species of *Diosma,* all $2n = 30$, we suggest that $x = 15$ is basic for the genus. In *Euchaetes* the single count suggests a generic base of $x = 14$; $x = 7$ seems unlikely since all other counts in Diosmeae are at paleotetraploid or paleohexaploid levels.

Basic chromosome number for Rutaceae is most likely $x = 9$ as suggested by Smith-White (1954). This hypothesis is founded on the predominance of $n = 18$ and 36 in the unspecialized Xanthoxyleae and Flindersieae, and Ehrendorfer (1981, 1987) has also pointed out the occurrence of only $n = 9$ and 18 in Aurantieae. Data for Diosmeae throw no direct light on the possible base number for the family, as they are relatively specialized. However, the number in *Calodendrum,* $n = 27$, is most likely paleohexaploid based on $x = 9$, and the same base number is by extension probable for all Diosmeae, given the basal position of *Calodendrum* in the tribe. Other genera of Diosmeae that have been counted appear fundamentally paleotetraploid, a view endorsed by Guerra (1984b) for *Coleonema* based on a comparison of genome size in Rutaceae. Thus *Coleonema,* either $n = 18$ or 17, is probably hypotetraploid based on $x = 9$. The base of $x = 15$ in *Diosma* may represent either further aneuploid decrease from an ancestral $x = 18$, or less likely, allopolyploidy from hypothetical ancestors with $x = 7$ and 8. *Euchaetes,* closely related to *Diosma,* with $n = 14$ fits with the apparent trend for decrease from an ancestral tetraploid base. *Adenandra* appears basically paleotetraploid (? $x = 14$) but some species may be octo-

ploid and derived from the secondary hypotetraploid base. This may best explain the range from $n = 25$, 24, 21, and 19, as well as $n = 14$ in two species.

Further counts in Diosmeae are needed to resolve the several questions that this initial study has posed. The variation in chromosome number in the tribe is unexpected and is likely to be of considerable value in future studies of generic limits and of the relationships of genera and species, and ultimately of phylogeny.

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